# REVIEWS.

FLORA OF THE CAPE PENINSULA. Edited by R. S. Adamson, M.A., D.Sc., and T. M. Salter (Capt. (S) R.N. Retd.), Cape Town and Johannesburg. Juta & Co., pp. xx + 890. 55s.

This is the first full-scale local flora to be published in South Africa, and it is fitting that it should concern the area from which came the first South African plants to meet the eyes of botanists—a Stapelia, an Aloe, a Haemanthus and others—the area of the first callers from Europe and of the first European settlement.

Since those early days the Cape Peninsula has received closer botanical study than any other part of the Union, and its wealth of species, and the beauty of many of them, have been a constant source of wonder in view of its limited area. Even now one would hesitate to say that the flora is fully known. Much of the terrain is difficult and the collector needs to be a reasonably active and hardy person. There are still many spots in the mountains which are unvisited by botanists in which—in view of the narrow localisation of many species, and the recency of many discoveries—there may well be new species or new records awaiting the collector. Recent critical study moreover has resulted in better understanding and in the recognition of specific distinctness within groups formerly merely regarded as variable: and much still remains to be done in certain genera. The new Flora will be a stimulus to further work.

The Cape Peninsula flora, perhaps to a greater extent than that of any other part of South Africa, must be regarded as unstable under present conditions. Like many insular floras it contains many local forms and endemics which are peculiarly vulnerable to human interference. A process of extermination has been going on ever since the early settlers exploited the timber and introduced cultivation and grazing, this process having been greatly accelerated in recent years owing to building development, afforestation, flower-picking and the cumulative effects of too frequent fires. This has naturally affected the lower ground most; some of the richest areas such as the lower slopes of Devil's Peak, Green Point Common and the Tokai and Constantia flats, are now almost completely changed; other, such as Wynberg Hill and the Camps Bay slopes are fast losing their native floral wealth. It is only on the mountains and in fortunate areas of special reservation and care such as Kirstenbosch, the Camp Ground and the Cape of Good Hope Nature Reserve, that the flora maintains much of its original richness.

With the disappearance (and the authors, one is glad to note, use the emphatic word extermination) of the indigenous flora has come the invasion of a multitude of aggressive alien weeds: many of them trees and shrubs, favoured in their spread by human agency, such as the Cluster Pine, three species of Hakea, half a dozen Australian Acacias; others cosmopolitan herbaceous weeds of warm temperate climates, introduced grasses, etc., which have colonised the spaces disturbed by building, roadmaking and cultivation. The authors have included a considerable number of such aliens as have firmly established themselves.

This Flora then comes at a time which must be regarded as opportune. It records the composition of an amazingly rich piece of the world's vegetation before it has, as someone said, become merely of an antiquarian interest—a moment which, one fervently hopes, may never arrive: it points out how much has been lost or nearly lost for ever, and how many alien elements have come in, probably for ever. And, in spite of all the evidence of change, it places before the botanist and the general reader a picture of one of the floristic wonders of the world.

The authors of the Flora include no less than 2,622 species of vascular plants, distributed among 702 genera. This is done without undue tendency to splitting, and the number of varieties described is very small. The majority of varieties are distinguished in genera which have received the most careful study (e.g. Oxalis) and in the case of alien weeds, where the varieties are, as it were, transferred from their sources overseas. There is little doubt that the great majority of species are "good", with perhaps a tendency to lumping in some cases (e.g. Sarcocolla, Erica mammosa). Compared with such an intensively studied flora as that of Great Britain, the amount of specific and varietal splitting that has been done is insignificant. In some cases, on the other hand, species that may be separated with fair certainty on the Peninsula tend to lose their distinctness when their mainland representatives are taken into account: (e.g. Metalasia cephalotes and caespitosa): this perhaps reflecting local isolation among a group of closely related forms, which a wider study will elucidate.

In view of the great difficulties involved and the number of collaborators who have contributed their own special sections to the Flora, one of its remarkable features is the editorial control which has made of it a balanced and uniform work. Individual minor differences of treatment exist, but the contributors have subordinated their work to the general plan in a way that must have been difficult to achieve and which makes the Flora an admirable example of team work.

The Engler system has been followed, and this will perhaps be regretted by some, as its theoretical advantages are questionable, and especially as all three herbaria in the Cape Peninsula use the Bentham-Hooker system, firmly established in South Africa at present by the Flora Capensis.

Identification of plants is facilitated throughout by dichotomous keys of a simple type. Unwieldy groups are subdivided into artificial sections for convenience, and the keys themselves reflect practical considerations rather than natural relationships: these are, however, displayed as far as possible in the arrangement of the genera and species themselves.

Perhaps the most striking feature of the book is the fact that it represents new work from beginning to end. The authors have studied the plants and have made their descriptions therefrom, in the majority of cases from fresh material. There has been a minimum of copying from other work, and the result is an authenticity which is worthy of the highest praise. The authors are all resident in the Cape Peninsula and are familiar with its living plants in a way that gives their treatment a value which is so often conspicuously absent from the perfunctory products of certain overseas authorities. While this first-hand knowledge and treatment does not always place the written results beyond criticism and correction, it gives them a realism which herbarium work alone, unless done by a genius, can never achieve. The work entailed has been enormous, but it has been emphatically worth while.

The same local knowledge and personal familiarity with the living plants appears—rather unequally perhaps—in the notes given as to localities, abundance or rarity, seasons and so on. Another welcome feature of the descriptions themselves is the inclusion of notes on flower colour, perfume, hours of opening, stature, etc. This kind of information is of the greatest practical value and interest to the student and amateur, and should always be taken into account by experienced botanists as well, but its absence mars many a Flora.

The accounts of the groups and species are not monographs, and they omit much detail that would be included in a more special treatment. Herbarium specimens are not cited. Synonymy is excluded except in cases where, owing to adherence to international rules of nomenclature, a familiar name (e.g. one used in the Flora Capensis) has to be replaced by another. To include such technical matters would be out of place in a local Flora, and would have swelled its already great bulk beyond measure. For the same reason illustrations have been completely excluded—more regrettably, perhaps, as a small sketch has often great practical diagnostic value.

During the compilation of the Flora, a considerable number of new species and varieties were discovered and discriminated, new records and localities for older species were established, and many changes in nomenclature had to be effected. As it is undesirable to publish *novitates* in a general work such as this, the authors have used the opportunities afforded for this purpose by the Journal of South African Botany during the last fifteen years.

Citations are not given, but an index to vols. I—XV of this Journal will shortly be published and will enable reference to be made to the full (and often illustrated) original descriptions.

Any criticisms that can be made are relatively insignificant. The less satisfying parts of the book concern the less essential features—the derivation of some of the commemorative generic names where fuller notes would have been acceptable (e.g. Watsonia, Ferraria, Willdenowia, Lamarckia)—and the popular names, a considerable number of which can hardly be regarded as current in the Cape Peninsula, others being artificial and many being simply the overseas names of aliens. Misprints are very few (see Homalanthus, Mercurialis).

The book contains a useful explanatory introduction, a glossary of technical terms, indexes of scientific and popular names, and has a map of the Cape Peninsula for the end-papers.

It is clearly printed with well-chosen types and well bound: in spite of its more than 900 pages it is reasonably light in the hand and opens well. The printers are the Rustica Press, Wynberg.

A cordial welcome should be given to this Flora, an admirable and much needed work, of great practical value to student, mature botanist and intelligent visitor, a sound foundation for further work and an excellent example for future local Floras of South African districts.

R. H. COMPTON.

THE ACTINOMYCETES: Their Nature, Occurrence, Activities and Importance. By Selman A. Waksman, Ph.D. (Annales Cryptogamici et Phytopathologici, Vol. 9). Waltham, Mass.: The Chronica Botanica Co. (Johannesburg: Central News Agency, Ltd.) $5.00.

The Actinomycetes have not received as much attention from investigators as have either the fungi or the true bacteria, largely on account of the great difficulty experienced by the average worker in their identification. However, the recent discovery that some members of the group produce important antibiotics has brought them into prominence, and much valuable information on their morphology, life-cycles and biochemical activities is being published. Professor Waksman's monograph presents the available information with his usual clarity and conciseness.

The book begins with an account of all the systems of terminology which have been used since the first taxonomic description of an Actinomycete was published in 1877. The author discusses the value of ecological, cultural, morphological, biochemical and serological characteristics, and of phage specificity, and comes to the conclusion that morphology is a reasonably reliable basis for classification.

His account of what is known of the metabolism of these organisms leads on to a discussion of their possible future importance as a source of certain enzymes and vitamins, and to a detailed account of their antibiotic properties. A useful classification of the antibiotics produced by these organisms is given, with a description of methods of isolating and testing strains for antibiotic properties, and some detail of the methods used in the manufacture of streptomycin. The phenomenon of autolysis and its importance in streptomycin production is also discussed.

The chapters on the part played by Actinomycetes in natural processes include a fascinating account of their activities in the destruction of pathogenic bacteria in the soil, and a description of their activities as plant pathogens. The final chapter treats of their medical importance.

A worker beginning the study of this group should be considerably helped by the very full descriptions of genera, and by instruction given in culture methods and in the making of microscopic preparations. The book is illustrated with many photomicrographs, some of which are not as clearly reproduced as they might be.

D. L. Olivier.

Vegetable Gums and Resins. By F. N. Howes. Waltham, Mass.: Chronica Botanica Co. (Johannesburg: Central News Agency), pp. xxii + 188, figs. 42. $5.00.

From the botanical point of view the gums and resins are perhaps the most interesting of all plant products. In practically all cases they are obtained from wild sources in remote parts of the world, and cultivation rarely enters into the picture: the collectors are mostly primitive people living close to subsistence level and subject to market vagaries and exploitation. In fact the author dedicates this book to "the collectors of gums and resins in all parts of the world, many of whom, especially on the African continent, live in humble circumstances and carry out their work under arduous conditions." Africa is indeed the source of a large proportion of the important gums and resins. Gum Arabic and other Acacia gums are outstanding: the Anglo-Egyptian Sudan normally exports more than 20,000 tons annually, and large quantities also come from Senegal, Nigeria and Tanganyika. Among the other important resins Africa produces Congo Copal, East African Copal, West African Copal, Sandarac, Frankincense, and others. The quantity of gum and resin produced in the Union is very small, but Cape Aloes is of special interest.

The natural products hold their own in technology, though synthetic resins are of increasing importance. An interesting development is the production of "copal-type synthetics" in which natural copals are blended with phenolic and maleic synthetics, the product combining good qualities of both.

The present volume is an admirable compilation of information about the extraordinary number of gums and resins in use, their sources, properties, methods of collection and marketing, utilisation, economics, etc. To the botanist the work is full of interest and surprises. The author, Dr. Howes, is Curator of the Museums of Economic Botany in the Royal Botanic Gardens, Kew, and is specially well equipped for his task by his ability and his surroundings: he has produced a book good both for reading and for reference.

R. H. COMPTON.

THE FIG. By G. I. J. Condit. Waltham, Mass.: Chronica Botanica Co. (Johannesburg: Central News Agency), pp. xviii + 222, figs. 27. $5.00.

This is a useful summary, with full bibliography, of the cultivated fig, its history, botanical features, varieties, fruit characters, caprification, breeding, cultivation, districts and climatology, culture, cropping, diseases and pests, marketing, products, chemistry, etc. It is well worth study in South Africa, where fig culture—especially that of the Smyrna type—surely deserves more attention than it is given at present.

R. H. COMPTON.

WATER IN THE PHYSIOLOGY OF PLANTS. By A. S. Crafts, H. B. Currier and C. R. Stocking. 240 pages; 1949; price $6.00; published by the Chronica Botanica Company, Waltham, Mass., U.S.A. Johannesburg: Central News Agency.

It is unfortunate that this authoritative monograph makes such heavy reading. This is especially true of the first two chapters on the structure of water and on the properties of solutions. However, after the first two chapters, this book becomes more readable, although, like many monographs, it never becomes what could be termed easy reading. But then the problems with which it deals are very complex.

In their chapter on the mechanism of osmosis, the authors introduce the new standard terminology now in use in the U.S.A. This will remove a great deal of misunderstanding that has existed, owing to the multiplicity of terms in use. Suction Pressure is now written as D.P.D. (Diffusion Pressure Deficit); Osmotic Pressure is now defined as the full potential maximum turgor pressure which can develop in a system in a state of equilibrium, and so on. While some of these terms may not be in common use here, their value as standard terms is readily appreciated.

The sections of the book dealing with water as a plant component, the osmotic qualities of plant cells and active water relations, are very clear indeed. In these chapters the criticism of methods used in experimental techniques is very good and the summaries are of the same high standard. These are undoubtedly the best chapters in the book.

A book of this type must be of great interest to South African botanists as water plays such a dominant part in the limiting of growth in this country. Perhaps the most important observation from our point of view made by the authors is the following:

"Though plant exploration may find plants better able to survive drought, and hybridization my result in plants with more extensive root systems, it seems that the most promise [of cultivating drought-ridden areas] lies in the possibility of conserving and utilizing our existing supplies of water more fully". Plants cannot be bred for all types of drought conditions. However, drought-resistant plants can be successfully bred, within limits. Investigation of the rôle played by bound-water in drought resistance are clearly worth more research, as are researches into the part played by colloids in these drought-resistant plants. These would enable us to recognise what special characteristics must be looked for in drought-resistant plants. Only when these characteristics are clearly understood can the geneticists endeavour to introduce them into new hybrids.

A book covering such a vast field cannot be accurate on all points, yet the errors in this book are remarkable for their scarcity. There is, however, one passage which is rather surprising. It is in the section dealing with translocation of substances in the phloem. The authors try to explain this by suggesting that the mechanism is probably a mass flow "along a hydrostatic gradient developed osmotically", while protoplasmic streaming is not considered as probable. Surely the reverse is the case?

The most useful feature of the Chronica Botanica publications is their bibliography. This book is quite up to the usual standard, as there are eighteen pages of bibliography. It is a book which every physiologist should try to obtain for his reference library.

K. H. SCHÜTTE.